

WHAT IS CLAIMED IS:

1                   1.     A steering wheel for a motor vehicle, the steering wheel  
2     having a front side with a center and a back side, the steering wheel comprising:  
3                   a steering wheel module supporting electrical/electronic  
4     subassemblies, the steering wheel module being inserted from the front side into the  
5     center of the steering wheel to be attached to the steering wheel;  
6                   wherein a lower end of the steering wheel module forms a torsion  
7     module of a torque detection device for a steering power-assist system, the torsion  
8     module being operable to receive and be attached to a steering spindle of a steering  
9     column on the back side of the steering wheel in order to attach the steering wheel  
10    to the steering spindle when the steering wheel module is attached to the steering  
11    wheel.

1                   2.     The steering wheel of claim 1 wherein:  
2                   the torsion module is a spoke wheel having a hub piece that is  
3     operable to receive and be attached to the steering spindle, the spoke wheel further  
4     having a rim that concentrically surrounds the hub piece through a plurality of  
5     flexible spokes.

1                   3.     The steering wheel of claim 2 wherein:  
2                   the rim includes attachment holes which run parallel to an axial axis  
3     of the hub piece, the attachment holes for receiving bolts attached to the steering  
4     wheel module in order to attach the steering wheel module to the spoke wheel.

1                   4.     The steering wheel of claim 2 wherein:  
2                   the spoke wheel includes limit stop spokes arranged alternately with  
3     the flexible spokes, the limit stop spokes being joined to the hub piece and the rim  
4     such that the limit stop spokes are prevented from being rotated with respect to the  
5     hub piece and such that ends of the limit stop spokes engage limit stop arrangements  
6     located on the rim.

1                   5.     The steering wheel of claim 4 wherein:

2                   each limit stop arrangement is formed by two stop beads in the rim,  
3                   each bead pointing radially inwards toward the hub piece.

1                   6.       The steering wheel of claim 2 wherein:  
2                   the flexible spokes of the spoke wheel include strain gauges for the  
3                   detection of torque applied on the steering wheel.

1                   7.       The steering wheel of claim 4 wherein:  
2                   the limit stop spokes of the spoke wheel are limited by stops along  
3                   the axial direction of the hub piece in order to hinder relative movement between the  
4                   hub piece and the rim in the axial direction.

1                   8.       The steering wheel of claim 1 wherein:  
2                   the electrical/electronic subassemblies of the steering wheel module  
3                   include an analysis device for evaluating the torque exerted on the steering wheel  
4                   as detected by the torsion module.

1                   9.       The steering wheel of claim 1 wherein:  
2                   the electrical/electronic subassemblies of the steering wheel module  
3                   include an airbag unit.

1                   10.     A steering assembly for a motor vehicle, the steering assembly  
2                   comprising:  
3                   a steering wheel having a front side with a center and a back side;  
4                   a steering spindle of a steering column; and  
5                   a steering wheel module supporting electrical/electronic  
6                   subassemblies, the steering wheel module being inserted from the front side into the  
7                   center of the steering wheel to be attached to the steering wheel;  
8                   wherein a lower end of the steering wheel module forms a torsion  
9                   module of a torque detection device for a steering power-assist system, the torsion  
10                  module being operable to receive and be attached to the steering spindle on the back  
11                  side of the steering wheel in order to attach the steering wheel to the steering spindle  
12                  when the steering wheel module is attached to the steering wheel.

1                    11.    The steering assembly of claim 10 wherein:  
2                    the torsion module is a spoke wheel having a hub piece operable to  
3 receive and be attached to the steering spindle, the spoke wheel further having a rim  
4 that concentrically surrounds the hub piece through a plurality of flexible spokes.

1                    12.    The steering assembly of claim 11 wherein:  
2                    the rim includes attachment holes which run parallel to an axial axis  
3 of the hub piece, the attachment holes for receiving bolts attached to the steering  
4 wheel module in order to attach the steering wheel module to the spoke wheel.

1                    13.    The steering assembly of claim 11 wherein:  
2                    the spoke wheel includes limit stop spokes arranged alternately with  
3 the flexible spokes, the limit stop spokes being joined to the hub piece and the rim  
4 such that the limit stop spokes are prevented from being rotated with respect to the  
5 hub piece and such that ends of the limit stop spokes engage limit stop arrangements  
6 located on the rim.

1                    14.    The steering assembly of claim 13 wherein:  
2                    each limit stop arrangement is formed by two stop beads in the rim,  
3 each bead pointing radially inwards toward the hub piece.

1                    15.    The steering assembly of claim 11 wherein:  
2                    the flexible spokes of the spoke wheel include strain gauges for the  
3 detection of torque applied on the steering wheel.

1                    16.    The steering assembly of claim 13 wherein:  
2                    the limit stop spokes of the spoke wheel are limited by stops along  
3 the axial direction of the hub piece in order to hinder relative movement between the  
4 hub piece and the rim in the axial direction.

1                    17.    The steering assembly of claim 10 wherein:

2                   the electrical/electronic subassemblies of the steering wheel module  
3   include an analysis device for evaluating the torque exerted on the steering wheel  
4   as detected by the torsion module.

1                   18.    The steering assembly of claim 10 wherein:  
2                   the electrical/electronic subassemblies of the steering wheel module  
3   include an airbag unit.